

Appl. No. : 10/789,726
Filed : February 27, 2004

CLAIM AMENDMENTS

1. - 49. (Canceled)

50. (New)

A device for mixing a liquid such as paint comprising:

a plurality of vanes arranged to extend in a substantially circular configuration and adapted for attachment to a rotatable shaft for rotation of the vanes, wherein the plurality of vanes are further configured to generate a fluid flow that enters an internal area of the circular configuration from a top and bottom area of the circular configuration of the vanes and expels fluid through the vanes of the circular configuration helically upward and outward therefrom when the vanes are rotated in a liquid with a shaft.

51. (New)

The device of claim 50 further comprising:

aligned vanes, each vane having an inner edge and an outer edge, the vanes being arranged wherein the outer edges of the vanes define a frusto-conical boundary surface, wherein the frusto-conical boundary surface has a central axis;

a shaft having a proximate end and a distal end, the shaft being aligned along the central axis, the proximate end of the shaft being connected to at least some of the vanes for transmitting a rotating force on shaft to the plurality of vanes, the distal end of the shaft being adapted to be attached to a rotating drive means; and

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a plurality of turbines extending between the vanes and the shaft, each turbine having a first end attached to the shaft in fixed relation thereto for transmitting a rotating force on the shaft to the turbine, and second end attached to the vanes in fixed relation for transmitting a rotating force on the turbine to the vanes.

52. (New)

The mixing device according to claim 51 wherein:

the vanes define a top opening and bottom opening;

the turbines extend lengthwise between the shaft and the vanes; and

widthwise, the turbines are aligned parallel with the central axis extending radially outward therefrom, whereby the turbines do not inhibit entry of liquids through the top and bottom openings.

53. (New)

The mixing device according to claim 52, wherein each vane is curved.

54. (New)

The device of claim 50 further comprising:

aligned vanes, each vane having an inner edge and an outer edge, vanes being arranged wherein the outer edges of the vanes define a frusto-conical boundary surface;

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an upper rim and lower rim having a common central axis, the upper rim having a diameter different from the diameter of the lower rim, the vanes extending lengthwise between the upper rim and lower rim; and

a plurality of feet extending downward from the lower rim.

55. (New)

The device of claim 50 further comprising:

aligned vanes, each vane having an inner edge and an out edge, the vanes being arranged wherein the outer edges of the vanes define a frusto-conical boundary surface, wherein a first group of the plurality of vanes has a first length, a second group of the plurality of vanes has a second length longer than the first length, a bottom edge of the second group of vanes extending below a bottom edge of the first group of vanes for defining feet extending downwardly from the bottom edge of the first group of vanes, the vanes being arranged in a regular pattern alternating between vanes from the first group and vanes from the second group.

56. (New)

The mixing device according to claim 54, wherein each of the feet is curved and has a convex side and a concave side.

57. (New)

The mixing device according to claim 54, wherein the feet are orientated generally parallel.

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58. (New)

The device of claim 50 further comprising:

an upper rim and a lower rim having a common central axis, the upper rim having a diameter different from the diameter of the lower rim;

aligned vanes, each vane having an inner edge and an outer edge, the vanes extending lengthwise between the upper rim and the lower rim, the outer edges forming a frusto-conical boundary surface;

a shaft having a proximate end and a distal end, the shaft being aligned along the central axis, the distal end of the shaft being adapted to be attached to a rotating drive means; and

a plurality of turbines extending between the vanes and the shaft, each turbine having a first end attached to the proximate end of the shaft in fixed relation thereto for transmitting a rotating force on the shaft to the turbine, and a second end attached to the vanes or the upper rim or lower rim in fixed relation for transmitting a rotating force on the turbine to the vanes.

59. (New)

The mixing device according to claim 58 wherein:

the vanes define a top opening and a bottom opening;

the turbines extend lengthwise between the shaft and the vanes; and

widthwise, the turbines are aligned generally parallel with the central axis extending radially outward therefrom, whereby the turbines do not inhibit entry of liquids through the top and bottom openings.

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60. (New)

The device of claim 50 further comprising:

an upper rim and a lower rim having a common central axis, the upper rim having a diameter different from the diameter of the lower rim;

aligned vanes, each vane having an inner edge and an outer edge, the vanes extending lengthwise between the upper rim and the lower rim; and

a plurality of feet extending downward from the lower rim.

61. (New)

The mixing device according to claim 60, wherein each of the feet is curved and has a convex side and a concave side.

62. (New)

The device of claim 50 further comprising:

aligned vanes forming a circular or frusto-conical shape having a central axis, a top opening and a bottom opening;

a shaft attachment being aligned along the central axis, the shaft attachment being adapted to receive torque from a shaft; and

a plurality of turbines aligned lengthwise between the vanes and the shaft attachment, each turbine having a first end attached to the shaft attachment in fixed relation thereto for transmitting a rotating force on a shaft to the turbine, and a second end attached to the vanes in fixed relation for

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transmitting a rotating force on the turbine to the vanes, the turbines being adapted to avoid inhibiting passage of liquids from the top to the bottom opening.

63. (New)

The mixing device according to claim 62, wherein the turbines are aligned widthwise generally parallel with the central axis.

64. (New)

The mixing device according to claim 62, wherein the turbines are curved lengthwise.

65. (New)

The mixing device according to claim 62, wherein the turbines are curve widthwise.

66. (New)

The device of claim 50 further comprising;

aligned vanes, each vane having an inner edge and an outer edge, the vanes being arranged wherein the inner edges of the vanes defining a frusto-conical boundary surface; and

a plurality of turbines extending between the vanes and the shaft, each turbine having a first end attached to the shaft in fixed relation thereto for transmitting a rotating force on the shaft to the turbine, and a second end attached to the vanes in fixed relation for transmitting a rotating force on the turbine to the vanes.

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67. (New)

The mixing device according to claim 66 wherein:

the vanes define a top opening and a bottom opening;

the turbines extend lengthwise between the shaft and the vanes; and

widthwise, the turbines are aligned generally parallel with the central axis extending radially outward therefrom, whereby the turbines do not inhibit entry of liquids through the top and bottom openings.

68. (New)

The mixing device according to claim 67, wherein each vane is curved.

69. (New)

The device of claim 50 further comprising:

aligned vanes, each vane having an inner edge and an outer edge, the vanes being arranged wherein the inner edges of the vanes defining a frusto-conical boundary surface;

an upper rim and a lower rim having a common central axis, the upper rim having a diameter different from the diameter of the lower rim, the vanes extending lengthwise between the upper rim and the lower rim; and

a plurality of feet extending downward from the lower rim.

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70. (New)

The device of claim 50 further comprising:

aligned vanes, each vane having an inner edge and an outer edge, the vanes being arranged wherein the inner edges of the vanes defining a frusto-conical boundary surface, wherein a first group of the plurality of vanes has a first length, a second group of the plurality of vanes has a second length longer than the first length, a bottom edge of the second group of vanes extending below a bottom edge of the first group of vanes for defining feet extending downwardly from the bottom edge of the first group of vanes, the vanes being arranged in a regular pattern alternating between vanes from the first group and vanes from the second group

71. (New)

The mixing device according to claim 70, wherein each of the feet is curved and has a convex side and a concave side.

72. (New)

The mixing device according to claim 70, wherein the feet are oriented generally parallel.